

REMARKS

Claims 1-3, 5-8, 10, 16-23 and 25-27 are presented for reconsideration.

In the Office Action, claims 9 and 16-24 were objected to; the allowance of original claims 1-10 was withdrawn and claims 1-10 and 16-24 were rejected under 35 USC 103 as being unpatentable over Gnadinger (U.S. 5,229,647) in view of Johnson et al (GB 2349014).

It is noted that in discussing the Request for Continued Examination in paragraph 1 on page 2 of the Office Action, the statement "was filed in this application after final rejection" is an incorrect statement, since the application had never been finally rejected and the Request for Continued Examination was filed after the issuance of the Notice of Allowance on April 22, 2003, so that the new prior art could be presented to the Patent Office.

By this amendment, claim 1 has been further amended to highlight the invention over the prior art and, in view of the amendments to claim 1, claim 4 has been cancelled, without prejudice, claim 5 has been amended to be dependent on claim 1 and claims 6 and 16-23 have been amended to overcome the Examiner's objections; claims 9 and 24 have been cancelled, without prejudice; claim 10 has been amended to further highlight the invention over the prior art and claims 25, 26 and 27 have been added and are dependent on claims 16, 1 and 10, respectively.

Applicant's invention is directed to an improved intermediate base for a module having at least one semiconductor component and to a semiconductor module having the base and either a semiconductor component or chip. To overcome problems with strains created by different rates of thermal expansion, the intermediate base is formed of a plastic material, which preferably has a coefficient of expansion which is approximately the same as the coefficient of expansion of the semiconductor component, so that both the base and the component will expand or contract at the same rate when subjected to a temperature change. However, when the component with the base is attached to a circuit carrier or circuit board, the coefficient of expansion of the module or base relative to the circuit board is different and, thus, a strain will occur when there is an increase in temperature. To overcome this, the

base also has annular notches surrounding each of the through-holes to form studs, which can compensate for different rates of thermal expansion.

The newly-cited patent to Gnadinger teaches providing through-holes through a semiconductor component, which through-holes, after applying an insulating layer, can receive a metal of a bump 20, which is connected either to a pad 23 or 22 on an upper surface of the semiconductor body, so that when a plurality of semiconductor bodies or wafers are stacked, as shown in Figs. 3 and 4, a through-connection is passed through each of the semiconductor wafers. As shown in Fig. 6, instead of the metal bump 20, a metallized layer 41 can be applied, which, then, is in electrical contact with the bump 20 on an upper surface. The reference does not teach or suggest a base body having a lower face with external connections and does not teach or suggest how the stack of wafers would be mounted on a printed circuit board.

The British Reference to Johnson, which claims priority from a U.S. Application that issued as U.S. Patent No. 6,341,071, discloses an arrangement where a contact pad, such as 42, has an annular groove, such as 43, to form a stud-like material, which, when connected by a solder ball, such as 48, to another connection on the member 50 can increase the height of the solder ball to compensate for strains applied to the connection. It is noted that the reference does not teach or suggest a metallized through-hole extending to an internal connection on an upper surface and connecting it to an external connection on the lower surface. It is noted that in Fig. 10, a through-hole 220 is shown which has the pad 212 connected by a wire 222. It is also noted that the semiconductor components, such as 46, are connected by a solder ball on the upper surface of a plate-like member 42.

It is respectfully submitted that claims 1-8 and 26 are patentable over the combination for the following reasons. First of all, contrary to the Examiner's position, there is no teaching or suggestion of combining the bits and pieces of the British Reference with the patent to Gnadinger. The only suggestion of making this combination is applicant's disclosure. Therefore, it is submitted that the combination is based solely on hindsight, which is contrary to the Patent Laws. Thus, the combination is an improper combination.

It is also submitted that even if the combination were proper, there is no teaching or suggestion of the base body being a film composed of a plastic material, whose coefficient of expansion is approximately the same as the coefficient of expansion of the semiconductor component, as recited in claim 1, as amended. Thus it is submitted that substantial additional teachings, which are only present in applicant's disclosure, would be required in order to render independent claim 1 and dependent claims 2-8 and 26 obvious to a person of ordinary skill in the art. It is noted that the Examiner recognizes that neither Johnson et al nor Gnadinger discloses the material of the base body, but contends that it would be obvious to one of ordinary skill in the art, although no evidence has been provided to support such a speculation. It is also submitted that, since Gnadinger is using a semiconductor layer, one would not form the annular grooves or voids 56 of the British Reference in the semiconductor material, since this would probably destroy the semiconductor circuitry. Thus, it is submitted that independent claim 1 and the dependent claims, such as 2-8 and 26, would not be obvious to a person of ordinary skill in the art and that these claims are, therefore, allowable.

With regard to claim 10, there is no teaching or suggestion in Gnadinger of securing the semiconductor chip on the plastic base body. For the reasons submitted hereinabove, it is respectfully submitted that claim 10 would not be obvious to a person of ordinary skill in the art in view of the teachings of the references applied in the rejection.

With regard to independent claim 16 and dependent claims 17-23 and 25, it is respectfully submitted that, as pointed out hereinabove, neither of the references teaches or suggests the base body being a plastic material having a coefficient of expansion approximately the same as the coefficient of expansion of the semiconductor component, the base body having an upper face on which internal connections are formed for connection to connecting elements of the semiconductor component, the semiconductor component being connected directly with the upper face of the base body so that the connecting elements rest directly on internal connections.

It is noted that the dependent claims, such as 17, recite that the base body is connected to the semiconductor component via an adhesive layer, which is a feature not

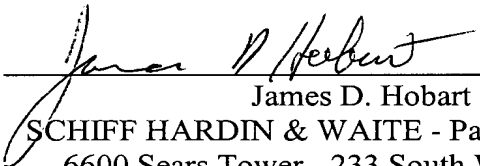
taught by any of the references of record. It is noted that in Johnson et al, solder balls are used and not an adhesive layer, such as applicant's layer 3.

For these reasons, it is respectfully submitted that independent claim 16 and dependent claims 17-23 and 25 are not obvious to a person of ordinary skill in the art and are allowable.

Claim 27 is dependent on claim 10 and recites the thin layer of adhesive material which secures the chip on the upper face. None of the references teach this feature and, therefore, claim 27 is allowable.

In view of the amendments and explanations contained hereinabove, it is respectfully submitted that this application is now in condition for immediate formal allowance and further reconsideration to that end is earnestly solicited.

Respectfully submitted,

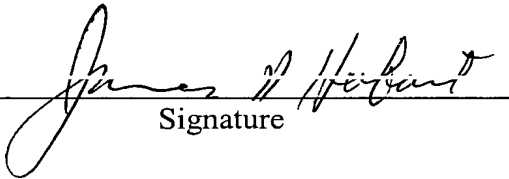
 (Reg. No. 24,149)
James D. Hobart
SCHIFF HARDIN & WAITE - Patent Department
6600 Sears Tower - 233 South Wacker Drive
Chicago, Illinois 60606
(312) 258-5781
Customer Number: 26574

DATED: December 11, 2003

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450 on December 11, 2003.

James D. Hobart
Name of Applicants' Attorney

_____
Signature

December 11, 2003
Date